REMARKS

The present invention is a method for speeding up forming stochastic numerical model of a Gaussian-type or a type representative of a distribution of a physical quantity in a porous heterogeneous medium, calibrated in relation to dynamic data obtained by measurements performed in the medium or by previous observations and a characteristic of displacement of fluids therein. The method includes an iterative process of gradual deformation wherein an initial realization of at least part of the medium is linearly combined, upon each iteration, with at least a second realization independent of the second realization, coefficients of the linear combining being such that a sum of the squares of the coefficients is one and an objection function measuring the difference between a set of non-linear data deduced from the linear combining by means of a flow simulator. The dynamic data are minimized by adjusting the coefficients of the linear combining, the linear process is repeated until an optimum realization of the stochastic model is obtained in which a rate of deformation of an optimum model representative of the medium is accelerated by selecting as the second realization to be combined with the initial realization at least one composite realization obtained by selecting before hand a direction of dissent defined as a function of gradients of an objective of a function in relation to all of the components of the initial realization. The claimed invention is an improvement in the field of gradual deformation which, *inter alia*, linearly combines an initial realization and a second realization as discussed, for example, in the Summary of the Invention.

The Assignee's United States Patent 6,813,565, 6,662,109 and 6,618,695 pertain to the well-known field of gradual deformation. Also see page 3, lines 15-23,

through page 4, lines 1-13, for a description of other prior art techniques of gradual deformation.

The present invention differs, *inter alia*, from the prior art by providing an iterative process of gradual deformation wherein an initial realization of at least part of the medium is linearly combined, upon each iteration, with at least a second realization independent of the initial realization, coefficients of the linear combining being such that the sum of the squares of the coefficients is 1, and an objective function measuring a difference between a set of non-linear data deduced from the linear combining by means of a flow simulator.

Claims 6-21 stand rejected under 35 U.S.C. §102 as being anticipated by United States Patent 5,729,451 (Gibbs et al). With respect to claim 6, the Examiner reasons as follows:

> As per claim 6, Gibbs anticipates a method for data fusion in a flow simulation with feature limitation very identical to the claimed invention (col.. According to Gibbs, the method includes
>
> Measurement of data performed in the medium,
>
> Linearly combining measurement data for data adjustment and simulation (col. 3, lines 15-29, col. 9, lines 36-65, for example),
>
> Performing a conjugate gradient search to select a direction of descent defined as a function of gradients of an objective function in relation to all the components (cols. 9, and 11-12).

These grounds of rejection are traversed for the following reasons.

The Examiner's reference to column 3, lines 15-29, and column 9, lines 36-65, is for the purpose of showing a linearly combining measurement as recited in the claims. However, the Examiner's conclusion is traversed in

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that the cited portions of Gibbs are submitted to not disclose the claimed linear combining.

As the Examiner is aware, for an anticipation rejection to be proper, it is necessary that every limitation of the claim must be literally or inherently set forth in the alleged anticipating reference. It is submitted that Gibbs et al pertain to optimization as described in column 7, lines 1-67, through column 8, lines 8-31. The process described therein is directed to minimizing a quadratic cost function as set forth in column 7. The process described therein does not meet the linear combining that is recited in the claims involving an initial realization and a second realization which are linearly combined such that the sum of the squares of the coefficients is 1. It is requested that the Examiner point out on the record any where the optimization process at a "Data Fusion Work Station" as described throughout the '451 Patent meets the foregoing limitations.

The claims have been amended to correct typographical errors and to improve their form for reexamination.
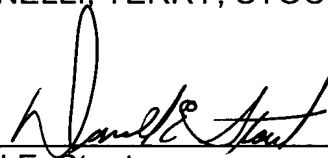
In view of the foregoing amendments and remarks, it is submitted that each of the claims in the application is in condition for allowance. Accordingly, early allowance thereof is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the

filing of this paper, including extension of time fees, to Deposit Account No. 01-2135

(612.43234X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

Donald E. Stout
Registration No. 26,422
(703) 312-6600

Attachments

DES:dlh